

MULTIMEDIA



UNIVERSITY

STUDENT ID NO

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MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2019/2020

MAX2053 – 3D SIMULATION

(All sections / Groups)

23 OCTOBER 2019

9.00 a.m - 11.00 a.m

(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This Question paper consists of 13 pages of simulated questions. Read them carefully.
2. This exam paper consists of TWO parts:

Part One: Multiple Choices	Answer ALL 30 questions
Part Two: Essay Questions	Answer TWO out of THREE
2. Simulate all your answers in the Answer Booklet. May the force be with you.

PART ONE: MULTIPLE CHOICE QUESTIONS

Answer ALL Questions in the Multiple Choice Answer Sheet.

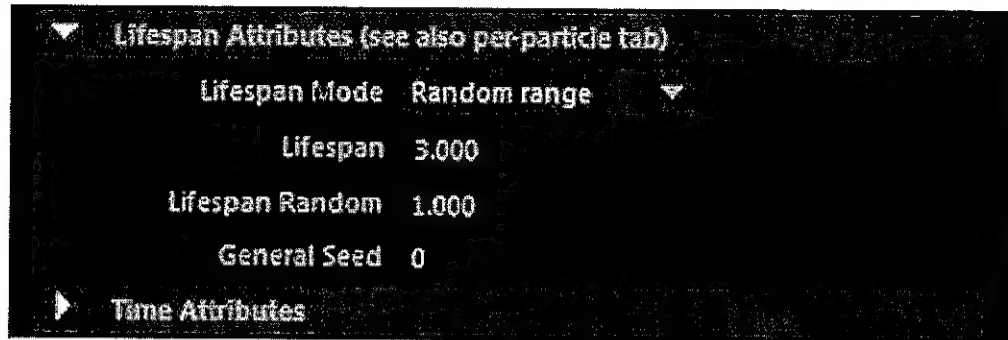


Image 01

1. Kevin created a new *ParticleShape* with lifespan settings shown above for a PAL TV production. Based on these settings, which statements below are **TRUE**?
 - I. Increasing '*General Seed*' will vary *Lifespan*'s randomization
 - II. All particles have a lifespan life of 3 seconds
 - III. *Lifespan* cannot be animated without animation *Lifespan Random*
 - IV. Some particles will last for more than 3 seconds
 - A. I and II
 - B. II and III
 - C. III and IV
 - D. I and IV
2. The magnitude of a dynamic field such as **Wind** and **Newton** decays the farther it is from the source. Which attribute controls this decay?
 - A. Decay Rate
 - B. Power
 - C. Attenuation
 - D. Distance
3. How do you bake a rigid body simulation?
 - A. Go to Solvers > Timeline > Bake Simulation
 - B. Go to *n*Cache > Frame > Bake Simulation
 - C. Go to Edit > Keys > Bake Simulation
 - D. Go to Modify > Attributes > Bake Simulation

Continued

4. Which statements below regarding Paint Effects uses in MAYA is **TRUE**?
- A. The Display Density attribute is used to adjust the Paint Effect's density for rendering
 - B. Paint Effects animation is controlled by dynamics simulation.
 - C. All objects must be set *Make Paintable* before Paint Effects can be applied
 - D. Paint Effects cannot be converted into Polygon.
5. Which particle render types listed below is a hardware based particle?
- A. Tubes
 - B. Clouds
 - C. Streaks
 - D. Bloppy Surface

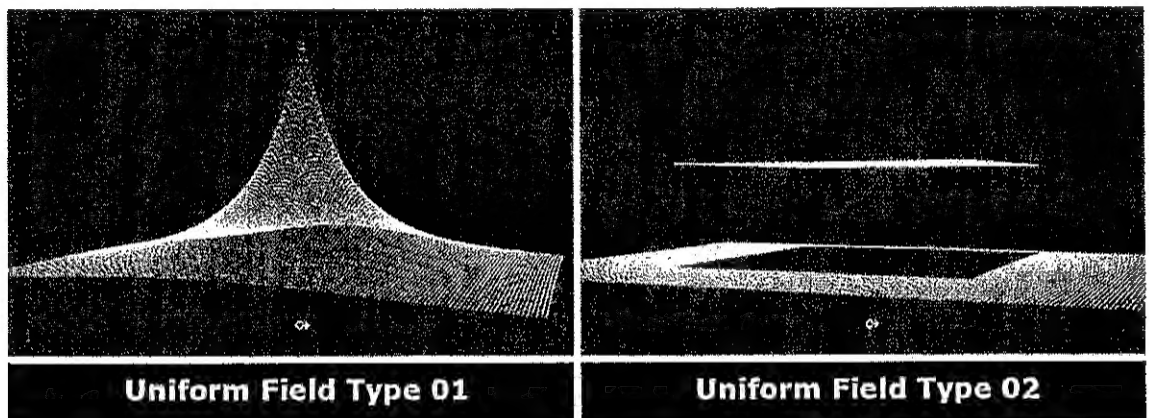


Image 02

6. *Image 02* shows two simulation results of a particle grid with a single uniform field (positive Y-axis direction) placed under it. Uniform Field Type 01 has a gradual fall-off result where else Uniform Field Type 02 has a distinctive cutoff. How would you achieve the effect similar to Uniform Field Type 02?
- A. Animate the magnitude to decrease over time
 - B. Turn on the Max Distance option
 - C. Increase the attenuation value to 1
 - D. Decrease the attenuation value to zero

Continued

7. Sammy created a cannonball flying through the air. He used Maya rigid body to animate the cannonball. He wants the ball to drop down **after 30 seconds** of flight. How can he achieve this using the rigid body dynamic system?
- A. Assign a Newton field and keyframe its strength after 30 seconds
 - B. Animate the Translate-Y after 30 seconds
 - C. Assign a Drag field and keyframe its strength after 30 seconds
 - D. Animate the Conserve value to decrease after 30 seconds

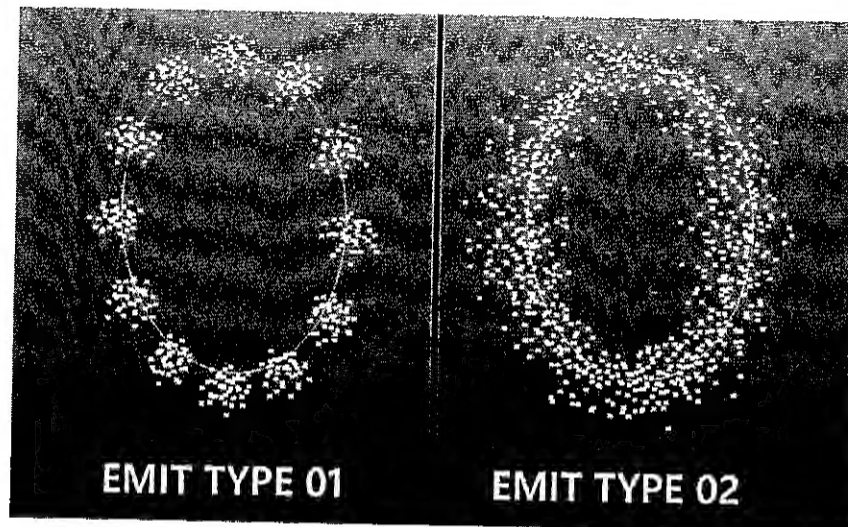


Image 03

8. *Image 03* above shows an attempt to emit particles from a curve. By default, you would get a result similar to *Emit Type 1*. How would you achieve a particle emission of *Emit Type 2* instead?
- A. Change emission type to curve emission
 - B. Increase the Spread attribute of the emitter
 - C. Increase the particle emission rate to cover the whole object
 - D. Change the particle type from points to multi-points
9. *nParticles* is a newer particle system used in Maya. What does 'n' stands for in *nParticles*?
- A. Nuclear
 - B. Next-Gen
 - C. Nexus
 - D. Nucleus

Continued

10. Which dynamics simulation systems would an artist use to create a belly jiggling effect on a 3D character model?

- A. Rigid Body Simulation with Springs
- B. Soft Body Simulation with Goals
- C. Soft Body Simulation with Goals with Springs
- D. Soft Body Simulation with Goals with Constraints

11. Which types of NURBS curves below are acceptable for *nDynamic Curve* simulations?

- I. CV NURBS curve
- III. Open NURBS curve

- II. EP NURBS curve
- IV. Closed NURBS curve

- A. I and II only
- B. II and IV only
- C. All of the above
- D. None of the above

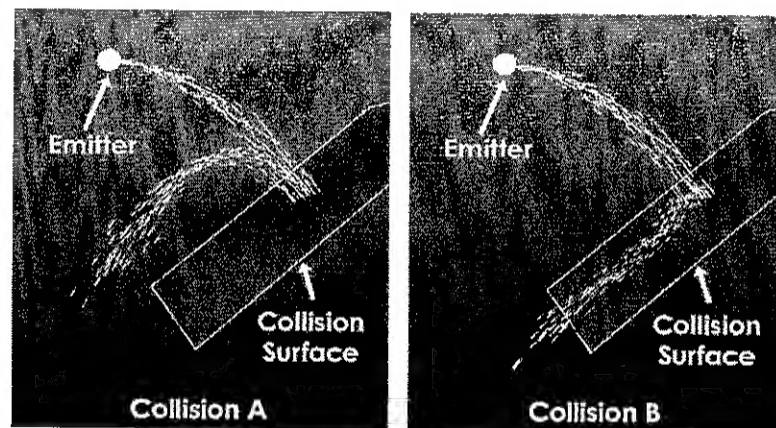


Image 04

12. *Image 04* above shows a simple particle collision setup using Maya legacy dynamic system. *Collision A* shows the particles bouncing off the collision surface where else *Collision B* shows the particles colliding and sliding off the surface. Which attribute is responsible to achieve a result similar to *Collision B*?

- A. Bounciness attribute
- B. Dynamic friction attribute
- C. Damping attribute
- D. Resilience attribute

Continued

13. Sheldon wants to attach a new fire effect with an existing turbulence field. Which MAYA editor would he use to complete the task?
- A. Dynamics Relationship Editor
 - B. Dynamics Component Editor
 - C. Dynamics Hypergraph Editor
 - D. Attributes Connection Editor
14. Which attribute below would you need to adjust in order to create a loose rope effect using nHair?
- A. Increase the Stretch Resistance and Bend Resistance.
 - B. Decrease the Stretch Resistance and Bend Resistance
 - C. Increase the Stretch Resistance, Decrease the Bend Resistance
 - D. Decrease the Stretch Resistance, Increase the Bend Resistance

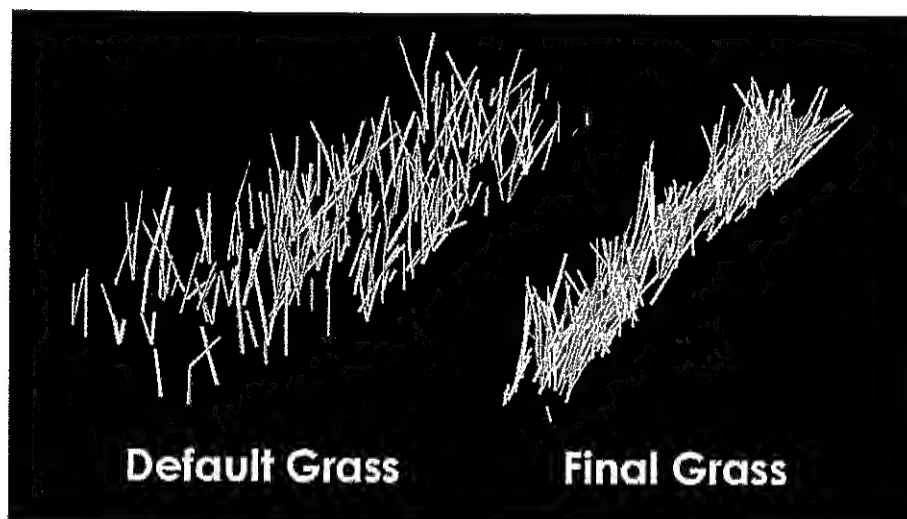


Image 05

15. Image 05 above shows an example of a *Paint Effects grass stroke*. How would you modify the grass stroke attributes to achieve a result similar to the Final Grass above?
- A. Minimize the brush width
 - B. Minimize the global width
 - C. Increase the sample density and scale the stroke size
 - D. Increase the density per step attribute

Continued

16. Amy created a scene where her character smashes a metal door with her hands. She used Soft body dynamics to create a dented metal door effects but the soft body effect does not stop deforming after collision. What can she do to achieve a more convincing deformation result?

- I. Decrease the conserve value
- II. Increase the friction value
- III. Decrease the goal weight value
- IV. Increase the damping value

- A. I and II
- B. I and IV
- C. II and III
- D. III and IV

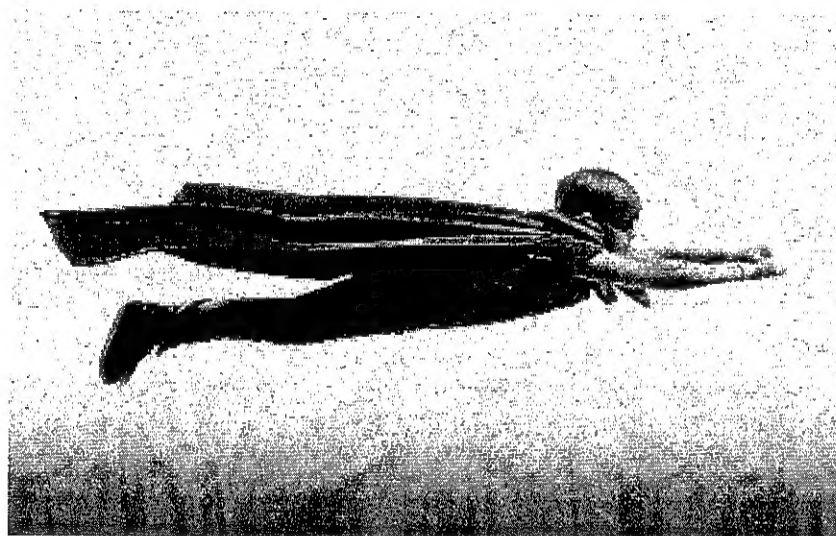


Image 06

17. *Image 06* above shows an nCloth 3D cape constrained to human character. Which nCloth constraint would be best to use to achieve this effect?

- A. Component Constraint
- B. Transform Constraint
- C. Point to Surface Constraint
- D. Hinge Constraint

Continued

18. Bernadette is trying to simulate a lot of rocks to fall onto a house using *Bullet* in MAYA. However, selecting each rock to tweak his simulation is hindering her speed and productivity. What is the **BEST** solution for her to improve her *Bullet* workflow?
- A. Create a set driven key on a single rock to automate selection for all rocks
 - B. Parent all the rock into one group and apply Bullet simulation onto the group
 - C. Create multiple selection handles to group the rocks together
 - D. Create a Rigid Sets to control all rock simulation attributes
19. Which statement below is **TRUE** regarding MAYA *Ocean* effects?
- A. It creates full realistic 3D surface water deformation and collision
 - B. The ocean's movement is simulated using Bifrost dynamic calculations
 - C. It can interact with MAYA fields and collision object
 - D. It is a flat NURBS surface with an *Ocean* shader assigned to the object

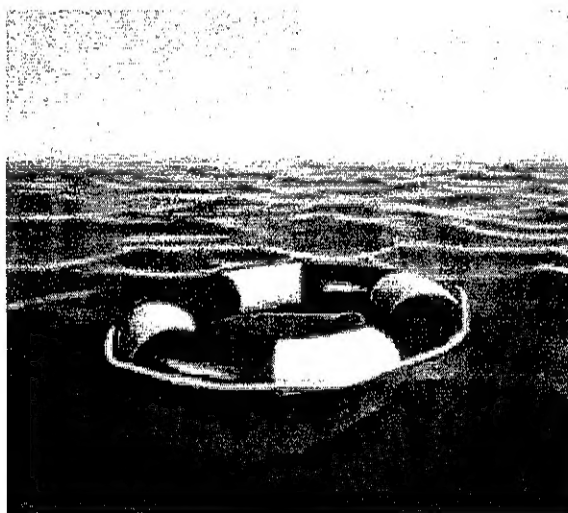


Image 07

20. *Image 07* above is a 3D safety buoy floating on Maya *Ocean*. Which *Ocean* tool can you use to create this effect effectively?
- A. Create Boat > Make Boat
 - B. Create Boat > Make Motor Boat
 - C. Ocean > Constraint To Surface
 - D. Pond > Make Collide

Continued

21. Which file naming structure below is most suitable for use as an animated texture for sprite particles?
- A. sprite-001.png
 - B. sprite_001.png
 - C. sprite.001.png
 - D. sprite.png.001
22. Enlarging a fluid container would cause the fluid content to look less dense. How would you increase the density of the fluid container?
- A. Increase the Fluid Resolution
 - B. Increase the Voxel Resolution
 - C. Increase the Threshold Resolution
 - D. Increase the Viscosity Resolution

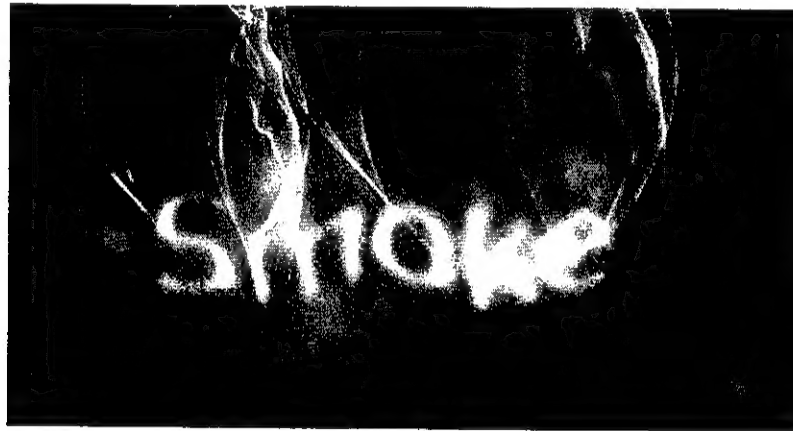


Image 08

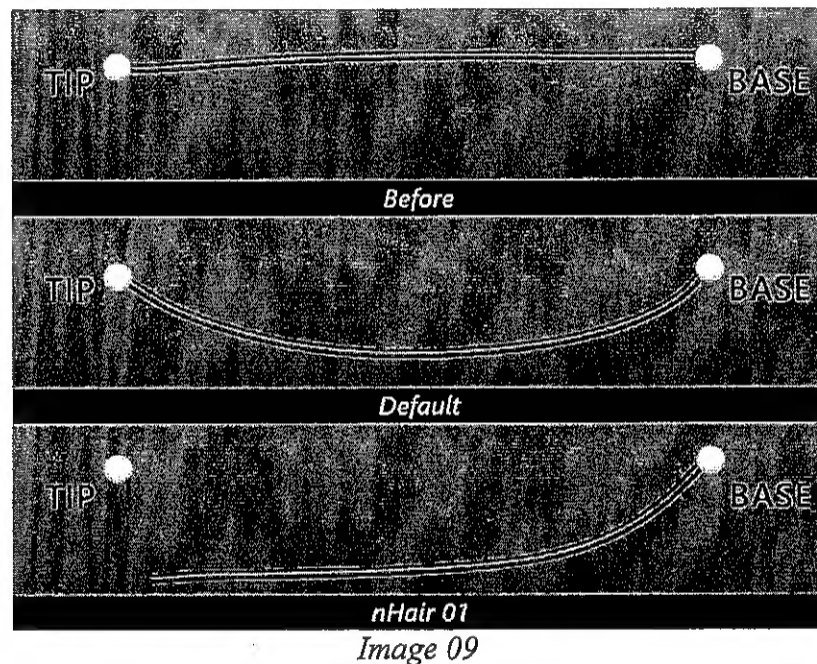
23. Image 08 is a text effect of **SMOKE** dispersing away. How would you create this effect using the *Fluid* dynamics system?
- A. 3D text of SMOKE emitting fluid particle and increase Turbulence attribute
 - B. 3D text of SMOKE emitting fluid particles with SMOKE Texture Map Transparency and increase Turbulence attribute
 - C. Texture map of SMOKE mapped to the Density attribute and increase Swirl attribute
 - D. SMOKE texture map applied to 2D Fluid container emitter attribute with increase Swirl attribute

Continued

24. *nCloth* can sometime cause the cloth to bunch or clump up during simulation. This is due to crossovers of points that happened during the cloth simulation. What can you do to minimise the crossovers and ensure a cleaner, better *nCloth* simulation results?

- I. Increase the Max Self Collision Iteration value
- II. Increase Substep
- III. Minimise the Push Out Value
- IV. Turn on the Self Trapped Check option

- A. I, II and III
- B. I, II and IV
- C. I, III and IV
- D. II, III and IV



25. *Image 09* is a simple dynamic curve using *nHair*. Without any modifications, the dynamic curve will result similar to 'default'. What would you need to modify to achieve the result reflected in *nHair 01* image?

- A. Keyframe the *nHair* constraint strength to 0
- B. Set the point lock to 'Tip'
- C. Set the point lock to 'Base'
- D. Delete the tip's follicle vertices

Continued

26. Howard tried to create a complex rigid body simulation on his project. However during simulation, the viewport playback lags and stutters, resulting in an inaccurate simulation result. What can he do to rectify the situation and ensure that he has a proper simulation result?
- A. Ensure that the playback keyframe is set at Smooth interpolation
 - B. Ensure that the viewport renderer is set to Viewport 2.0
 - C. Ensure that the playback max speed is set at Real-Time
 - D. Ensure that the playback speed is set to Play Every Frame

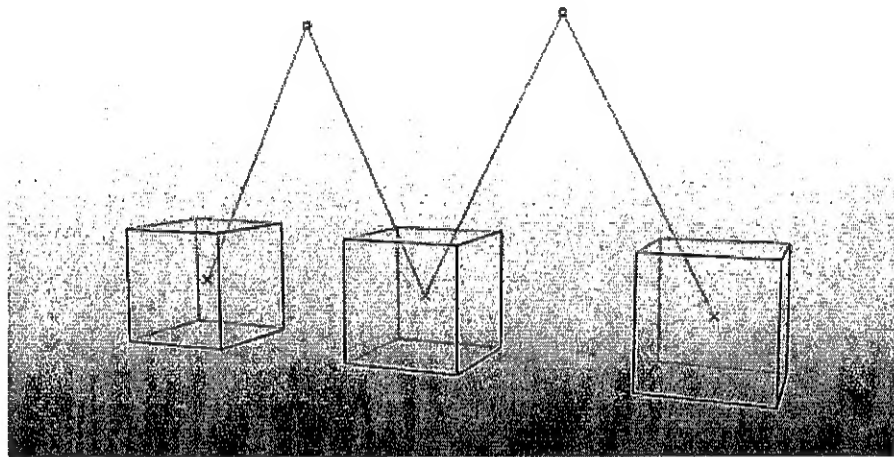


Image 10

27. Image 10 displays a certain type of constraint used in MAYA Rigid Body simulation. Which constraint is this?
- A. Hinge Constraint
 - B. Nails Constraint
 - C. Multi Constraint
 - D. Pin Constraint
28. Penny has created a scene of a rigid body cube moving on the X-axis. He wanted the cube to continuously move without ever stopping. How can he achieve this using the dynamic systems available?
- A. Assign a value to the impulse attribute
 - B. Assign a value to the initial velocity attribute
 - C. Decrease the static friction attribute
 - D. Decrease the conserve value

Continued

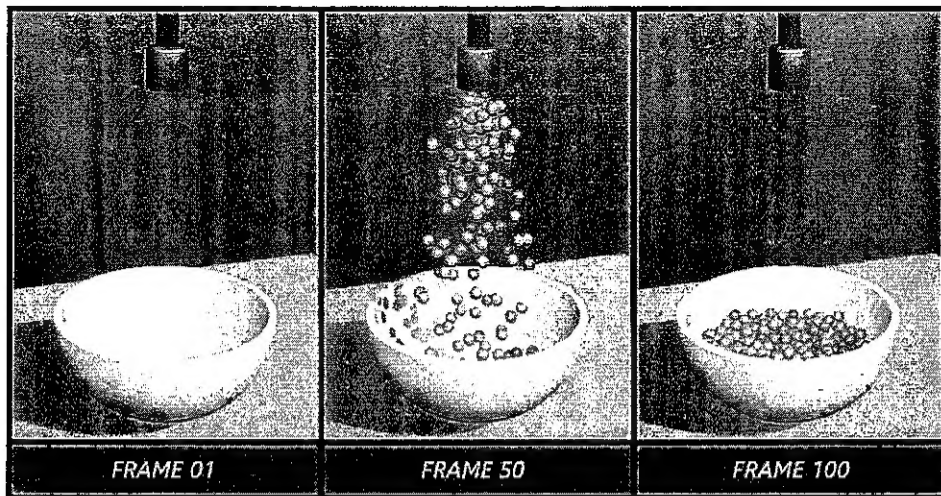


Image 11

29. The image above is a simple *nParticle* simulation of a bowl filling up with small particle balls. The simulation starts at frame 01 and ends at frame 100. How can you set the simulation to begin with all the balls already filled up in the bowl similar to frame 100?
- A. Select the particles at frame 100 and use Set the Initial State
 - B. Select the particles at frame 100 and keyframe the *particleShape* then drag the keyframe to frame 0.
 - C. Select the *Nucleus* node at frame 100 and keyframe the Time Scale attribute to 0
 - D. Select the *Nucleus* node at frame 100 and use Set the Initial State
30. The amount of particles emitted from a particle emitter in MAYA depends on its **Rate** value. How does MAYA measure the Rate value?
- A. Amount of particles emitted per cycle
 - B. Amount of particles emitted per frame
 - C. Amount of particles emitted per second
 - D. Amount of particles emitted per lifespan

PART TWO: ESSAY QUESTIONS

Answer TWO of the following Three Questions. Give DIRECT answers.

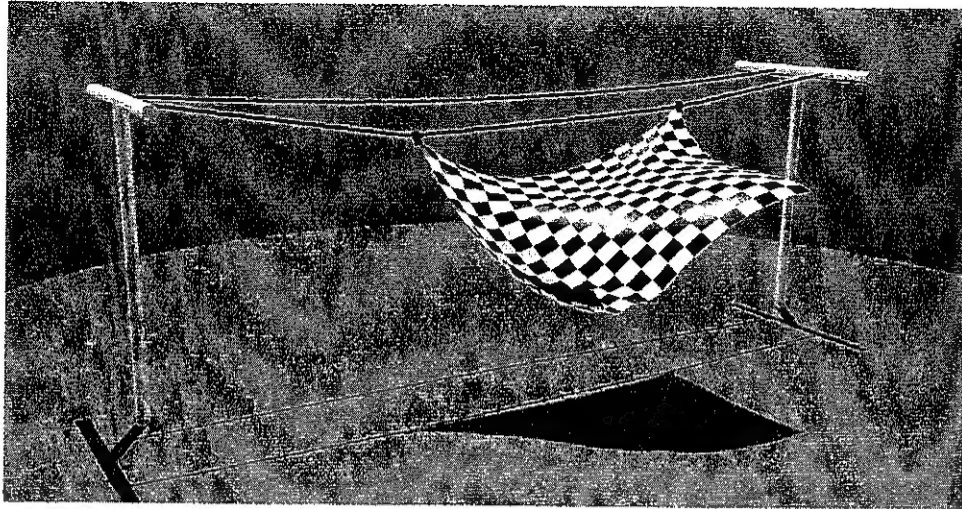
Question 1

Image 12

- I. *Image 12* above was taken from Pixar's blockbuster, *The Good Dinosaur*. The scene depicts the main characters running across a flock of white birds resting on the ground. The 3D birds fly away randomly as the characters approach them. Please **EXPLAIN** how this effect can be achieved using Maya *nParticles* system?
(16 marks)
- II. Explain what is the difference between a **SPRITES** particle type as compared to **CLOUD** type used in both particles system?
(4 marks)

Question 2

- I. List down and explain the **MANY** differences between MAYA Rigid Body and the BULLET dynamic system?
(10 marks)
- II. What is a **Rigid Body Set**, and what are the numerous benefits of using them during a BULLET simulation process?
(10 marks)

Question 3*Image 13*

- I. *Image 13* above is scene combination of ***nCloth*** and ***nHair*** of a checker blanket blowing in the air. The blanket is attached to the hanging rope with 2 clips. Based on your understanding of ***nDynamics***, how would you execute this effect step-by-step?

STEP 01: Model all the objects and ensure to delete all history.

STEP 02:

STEP X: ...

FINAL STEP: Simulate and cache the file for render.

(16 marks)

- II. Continuing from the above scene, please explain how would you create the effects of the blanket tearing off from the clips? Explain **BRIEFLY** your methods and tools used for the effect.

(4 marks)

**Please check, re-check and triple-check your answers until the exam ends*
End of Paper